

CLAIMS

1. An exhaust purifying apparatus for an internal combustion engine, **characterized by:**

5 a collector that is located in an exhaust passage of the internal combustion engine and collects particulate matter in exhaust gas;

a fuel supplying device that supplies unburned fuel to the exhaust passage to burn and remove particulate matter
10 collected by the collector, thereby regenerating the collector;

a determining section that determines whether particulate matter in the collector has been burned and removed; and

15 a controlling section that causes the fuel supplying device to supply unburned fuel to the exhaust passage after the determining section determines that particulate matter in the collector has been burned and removed.

20 2. The apparatus according to claim 1, **characterized by** an estimating section that estimates the amount of particulate matter in the collector based on the operating condition of the engine,

wherein the determining section determines that
25 particulate matter in the collector has been burned and removed based on the amount of particulate matter in the collector estimated by the estimating section.

3. The apparatus according to claim 1 or 2,
30 **characterized by** an exhaust purifying catalyst located in a section of the exhaust passage that is upstream of the collector, wherein the fuel supplying device supplies unburned fuel to a section of the exhaust passage that is upstream of the exhaust purifying catalyst.

4. The apparatus according to any one of claims 1 to 3,
characterized in that the controlling section causes the fuel
supplying device to intermittently supply unburned fuel to the
exhaust passage according to a fuel supply cycle that includes
5 a period in which supply of unburned fuel is executed and a
period in which supply of unburned fuel is not executed.

5. The apparatus according to any one of claims 1 to 4,
characterized by a detecting section that detects a pressure
10 difference between the exhaust pressure in a section of the
exhaust passage that is upstream of the collector and the
exhaust pressure in a section of the exhaust passage that is
downstream of the collector,

wherein the determining section determines that
15 particulate matter in the collector has been burned and
removed based on the exhaust pressure difference detected by
the detecting section.

6. The apparatus according to claim 5, **characterized by**
20 a comparing section that compares a predetermined value with a
exhaust pressure difference that is detected by the detecting
section at a point in time when the determining section
determines that particulate matter in the collector has been
burned and removed,

25 wherein the controlling section switches the manner in
which the fuel supplying device supplies unburned fuel to the
exhaust passage according to the result of comparison by the
comparing section.

30 7. The apparatus according to any one of claims 1 to 4,
characterized by:

a detecting section that detects a pressure difference
between the exhaust pressure in a section of the exhaust
passage that is upstream of the collector and the exhaust
35 pressure in a section of the exhaust passage that is

downstream of the collector; and

a comparing section that compares a predetermined value with a exhaust pressure difference that is detected by the detecting section at a point in time when the determining
5 section determines that particulate matter in the collector has been burned and removed,

wherein the controlling section switches the manner in which the fuel supplying device supplies unburned fuel to the exhaust passage according to the result of comparison by the
10 comparing section.

8. The apparatus according to claim 6 or 7,
characterized in that, when the comparing section determines that the exhaust pressured difference is equal to or greater
15 than a predetermined value, the controlling section causes the fuel supplying device to supply unburned fuel to the exhaust passage, the amount of which supplied unburned fuel is more than the amount required for completely burning particulate matter remaining unburned in the collector, and wherein, when
20 the comparing section determines that the exhaust pressured difference is less than the predetermined value, the controlling section causes the fuel supplying device to supply a predetermined amount of unburned fuel to the exhaust passage regardless of the amount of particulate matter remaining
25 unburned in the collector.

9. The apparatus according to claim 6 or 7,
characterized in that, when the comparing section determines that the exhaust pressured difference is equal to or greater
30 than a predetermined value, the controlling section causes the fuel supplying device to supply unburned fuel to the exhaust passage during a period that is longer than the period required for completely burning particulate matter remaining unburned in the collector, and wherein, when the comparing
35 section determines that the exhaust pressured difference is

less than the predetermined value, the controlling section causes the fuel supplying device to supply unburned fuel to the exhaust passage during a predetermined period regardless of the amount of particulate matter remaining unburned in the collector.

10. An exhaust purifying method for an internal combustion engine, **characterized by:**

collecting particulate matter in exhaust gas by a collector located in an exhaust passage of the internal combustion engine;

determining whether particulate matter in the collector has been burned and removed; and

supplying unburned fuel to the exhaust passage after it is determined that particulate matter in the collector has been burned and removed.